

WHAT IS CLAIMED:

1. An exercise apparatus comprising:  
a rotatably mounted axle;  
a flywheel axially mounted to said axle; and  
5 a line having a first end and a second end, said first end attached to said axle, said line having a first position wherein a portion of said line is wrapped about a portion of said axle and a second position wherein said line is unwrapped from said axle, wherein a force applied to said line in said first position creates an accelerating torque on said axle causing said axle to rotate  
10 as said line generally moves from said first position towards said second position.
2. The exercise apparatus of Claim 1 wherein a force applied to said line in said second position and when said axle is rotating creates a decelerating torque on said axle as said line generally moves from said second position towards said first  
15 position.
3. The exercise apparatus of Claim 2 wherein acceleration of said axle exercises a muscle group and deceleration of said axle exercises said muscle group.
4. The exercise apparatus of Claim 3 wherein said axle rotates in a first direction to exercise said muscle group during a first repetition and said axle rotates  
20 in a second direction to exercise said muscle group during a second repetition.
5. The exercise apparatus of Claim 1 further comprising a climbing exercise machine connected to said axle wherein acceleration and deceleration of said flywheel provides resistance to said climbing exercise machine.
6. The exercise apparatus of Claim 1 further comprising a spool axially  
25 mounted to said axle.
7. The exercise apparatus of Claim 6 wherein said spool is mounted to said axle with a narrow end proximate said first end of said line and a wide end distal said first end of said line.
8. The exercise apparatus of Claim 6 wherein, for a particular force  
30 applied to said line, said accelerating torque generally decreases as said line generally moves from said first position towards said second position and said decelerating

torque generally increases as said line generally moves from said second position towards said first position.

9. The exercise apparatus of Claim 1 wherein a generally constant force on said line generally continuously changes the acceleration of said axle.

5 10. The exercise apparatus of Claim 1 wherein a force on said line is resisted by a generally constant force.

11. The exercise apparatus of Claim 1 further comprising a pivot spaced from said axle, said pivot supporting said line between its first end and second end.

10 12. The exercise apparatus of Claim 11 wherein said pivot is located at one of multiple pivot locations.

13. The exercise apparatus of Claim 11 further comprising a spool axially mounted to said axle.

14. The exercise apparatus of Claim 13 wherein said pivot is located such that a portion of said line wraps about a portion of said spool.

15 15. An exercise apparatus comprising:  
a rotatably mounted first axle;  
a rotatably mounted second axle;  
a synchronizing assembly connecting said first axle and said second axle;

20 a flywheel axially mounted to said second axle; and  
a line connected to said first axle, said line having a first position wherein a portion of said line is wrapped about a portion of said first axle and a second position wherein said line is unwrapped from said first axle.

25 16. The exercise apparatus of Claim 15 wherein a force applied to said line in said first position creates an accelerating torque on said first axle and increases the rotational velocity of said flywheel.

17. The exercise apparatus of Claim 16 wherein, for a particular magnitude of said force, said accelerating torque decreases as said coiled portion decreases and said decelerating torque increases as said coiled portion increases.

30 18. The exercise apparatus of Claim 15 further comprising a spool axially mounted to said first axle.

19. The exercise apparatus of Claim 18 wherein said spool has a narrow end and a wide end, and wherein said line in said first position is wrapped about a portion of said spool.
20. The exercise apparatus of Claim 15 wherein a generally constant force on said line generally continuously changes the acceleration of said axle.
21. The exercise apparatus of Claim 15 wherein a force on said line is resisted by a generally constant force.
22. The exercise apparatus of Claim 15 further comprising a climbing exercise machine connected to said first axle, wherein acceleration and deceleration of said flywheel provides resistance to said climbing exercise machine.
23. The exercise apparatus of Claim 15 wherein said synchronizing assembly comprises:
- a first gear mounted on said first axle;
  - a second gear mounted on said second axle; and
  - a link connecting said first and second gears.
24. The exercise apparatus of Claim 23 wherein said first gear has a larger diameter than said second gear so as to increase the pull force required for a particular rate of pull.
25. The exercise apparatus of Claim 23 wherein said first and second gears are sprockets and said link is a chain.
26. The exercise apparatus of Claim 23 wherein said first and second gears are pulleys and said link is a belt.
27. An exercise apparatus comprising:
- a rotatably mounted axle;
  - a flywheel mounted to said axle;
  - a grip; and
  - a linkage between said grip and said flywheel wherein a first generally constant force applied to said grip results in generally continuously changing acceleration of said flywheel.
28. The exercise apparatus of Claim 27 wherein a second generally constant force applied to said grip results in deceleration of said flywheel.

29. The exercise apparatus of Claim 28 wherein acceleration of said flywheel exercises a first muscle group and deceleration of said flywheel exercises a second muscle group.

30. The exercise apparatus of Claim 29 wherein said first muscle group is an opposing muscle group to said second muscle group.

31. The exercise apparatus of Claim 29 wherein said axle rotates in a first direction to exercise said first muscle group and said second muscle group during a first repetition, and said axle rotates in a second direction to exercise said first muscle group and said second muscle group during a second repetition.

32. The exercise apparatus of Claim 27 further comprising a spool axially mounted to said axle.

33. The exercise apparatus of Claim 27 wherein said flywheel is axially mounted to said axle with a one-way clutch.

34. The exercise apparatus of Claim 27 wherein said axle is connected to a climbing exercise machine.

35. An exercise apparatus comprising:

a rotatably mounted axle;

a flywheel rigidly mounted to said axle;

a grip; and

a linkage wherein movement of said grip causes rotation of said axle and said flywheel.

36. The exercise apparatus of Claim 35 wherein said linkage is a line.

37. The exercise apparatus of Claim 36 further comprising a pivot spaced from said axle, wherein said pivot supports said line.

38. The exercise apparatus of Claim 35 wherein said linkage is a rigid bar.

39. The exercise apparatus of Claim 36 wherein said rigid bar has a first end and a second end, said first end connected to said flywheel and said second end connected to said grip.

40. The exercise apparatus of Claim 38 wherein said rigid bar has a first end and a second end, said first end connected to said axle and said second end connected to said grip.

41. An exercise apparatus comprising:

a rotatably mounted axle;

a flywheel axially mounted to said axle;

a line having a first end and a second end, said first end attached to said axle and a portion of said line proximate said first end wrapped around a portion of said axle, said second end attached to said axle and a portion of said line proximate said second end wrapped around a portion of said axle, wherein movement of said line causes a portion of said line to be wrapped around said axle and a portion of said line to be unwrapped from said axle.

42. The exercise apparatus of Claim 41 wherein movement of said line causes rotation of said axle and said flywheel.

43. The exercise apparatus of Claim 41 further comprising at least one pivot spaced from said axle, said pivot supporting said line.

44. The exercise apparatus of Claim 41 further comprising at least one grip attached to said line.

45. The exercise apparatus of Claim 41 further comprising a climbing exercise machine connected to said axle.

46. An exercise apparatus comprising:

a rotatably mounted axle;

a flywheel mounted to said axle

a spool mounted to said axle; and

means for creating a torque on said axle, said torque causing said axle to rotate.

47. An exercise apparatus comprising:

a rotatably mounted first axle;

a flywheel axially mounted to said first axle; and

a line having a first end and a second end, said first end being connected to said first axle, said line having a first position wherein a portion of said line is wrapped around a portion of said first axle in a first direction, a second position wherein said line is unwrapped from said first axle and a third position wherein a portion of said line is wrapped around a portion of

said first axle in a second direction opposite said first direction, wherein a force applied to said second end of said line in said first position creates an accelerating torque on said axle causing said axle and said flywheel to rotate as said line moves from said first position to said second position and to said third portion.

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48. The exercise apparatus of Claim 47 further comprising a spool axially mounted to said axle, said spool having a narrow end proximate said first end of said line and a wide end distal said first end of said line.

49. The exercise apparatus of Claim 47 further comprising a pivot spaced from said axle, said pivot supporting said line between its first end and second end.

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50. The exercise apparatus of Claim 47 further comprising a rotatably mounted second axle and a synchronizing assembly connecting said first axle and said second axle.

51. A method for creating a resistance for exercise utilizing the rotational inertia of a mass comprising the steps of:

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providing a positive work movement to create a first linear force;

translating said first linear force into an accelerating torque;

applying said accelerating torque to a flywheel so as to increase the rotational velocity of said flywheel;

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providing a negative work movement to create a second linear force;

translating said second linear force into a decelerating torque having a direction generally opposite said accelerating torque; and

applying said decelerating torque to a flywheel so as to decrease the rotational velocity of said flywheel.